



# Intellectual Property Awareness as a Catalyst for Innovation: A Case Study of Mulungushi University

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## ABSTRACT

In developing economies, universities are increasingly pivotal for driving innovation-led growth. However, their potential is often constrained by a lack of strategic knowledge management capabilities, particularly in the area of Intellectual Property (IP). This study examines the effect of IP awareness on innovation within Zambian higher education, using Mulungushi University as a case study. Grounded in innovation systems and knowledge management theories, it investigates how understanding IP rights, protection, and commercialisation influences research output, technology transfer, and entrepreneurial activity. Employing a mixed-methods design, the research surveyed academic staff, researchers, and students, and conducted interviews with administrators and IP officers. The findings reveal a strong positive relationship between IP awareness and innovation outcomes, including patenting, commercialisation, startup formation, and industry collaboration. Key constraints include absent IP policies, limited training, and weak enforcement. The study concludes that integrating IP into curricula, enhancing capacity-building, and strengthening institutional support can significantly boost innovation performance in Zambian universities.

**Keywords:** Intellectual Property Awareness; Innovation; Higher Learning Institutions; Research Commercialization; Knowledge-Based Economy; Zambia

## INTRODUCTION

In any economy worldwide, higher learning institutions occupy a strategic position within national innovation systems through their roles in knowledge generation, human capital development, and technological advancement. In recent decades, universities have increasingly been expected to move beyond traditional teaching and research functions to actively contribute to socio-economic development through innovation, entrepreneurship, and industry engagement. This has been necessitated by the desire for increased solution-based research, which results in derivable and tangible societal benefits and general socioeconomic development. Intellectual property has therefore become a central mechanism for safeguarding, managing, and commercialising knowledge outputs arising from academic research.

In Zambia, the expansion of the higher education sector has been accompanied by growing policy emphasis on research, innovation, and industrial development. The Higher Education Authority has made it a mandatory requirement for universities to deliberately facilitate the creation of the office of deputy vice chancellor in charge of research and innovation. Despite this progress, the translation of university-based research into marketable products, services, and technologies remains limited while society increasingly places expectations on academia to deliver tangible results. Existing evidence suggests that one of the key impediments to effective commercialisation is inadequate intellectual property awareness among academic staff and students. Limited understanding of IP rights, registration procedures, ownership arrangements, and commercialisation pathways often results in underutilization of research outputs and loss of potential socio-economic value.

While global studies have established a positive association between IP awareness and innovation performance, empirical evidence from Zambia remains scarce. This study addresses this gap by examining the effects of IP awareness on levels of innovation in higher learning institutions in Zambia, contributing to both academic discourse and policy debates on strengthening university-led innovation systems in developing economies.

The problem this study addresses is significant. According to the World Intellectual Property filing index report (2024) and patent filing statistics from the Patents and Companies Registration Agency (2024), no university in Zambia had a patent in a period of ten years preceding this date. While universities like Mulungushi University are mandated to drive knowledge-based development, a significant disconnect persists between knowledge creation and its commercialisation. Preliminary evidence suggests that a fundamental barrier is the widespread inadequacy of IP awareness among key academic actors. This study therefore investigates how the level of IP awareness among academic staff, researchers, and students at Mulungushi University influences the institution's innovation performance, and what key institutional and systemic factors moderate this relationship.

## LITERATURE REVIEW

Intellectual Property awareness constitutes a fundamental, multidimensional competency within knowledge-based economies. It refers not merely to passive recognition of IP types such as patents, copyrights, trademarks, and industrial designs, but to active understanding of their legal, strategic, and commercial implications. This encompasses knowledge of institutional and national policy frameworks, procedural pathways for protection, and the strategic value of IP as an asset for fostering innovation and driving socio-economic development.

The literature consistently positions IP awareness as a critical antecedent to innovation performance. Empirical studies across various national contexts indicate a strong positive correlation: researchers, academics, and students with higher levels of IP knowledge are demonstrably more likely to recognize the commercial potential of their work, engage in formal invention disclosure, pursue patent protection, and actively seek commercialisation pathways through industry collaboration, licensing, or spin-off creation (Baldini, 2010; Markman et al., 2005). This relationship is grounded in the principle that awareness acts as a primary catalyst, transforming abstract research output into tangible, protectable assets. Conversely, a pervasive awareness gap is identified as a significant structural barrier, particularly in developing economies where IP culture is nascent (WIPO, 2021).

Innovation within universities is a multifaceted construct, encompassing research productivity, technology development, entrepreneurial activity, and knowledge transfer to the wider economy (Etzkowitz, 2003; Perkmann et al., 2013). The university innovation process involves translation of ideas through sequential stages: from ideation and conceptualization, to proof-of-concept, onward to intellectual property protection, commercialisation, and ultimately the generation of economic return (Bradley et al., 2013). For this process to be effective, a robust institutional innovation system is required, supported by clear policies, commercialisation frameworks, dedicated technology transfer offices, sustainable funding mechanisms, and skilled personnel (Siegel & Wright, 2015). In the Zambian context, however, most higher learning institutions lack established technology transfer offices, creating a significant systemic gap (Mulenga et al., 2021).

Empirical studies consistently demonstrate a positive relationship between IP awareness and innovation outcomes. Universities with strong IP education programs and institutional support structures report significantly higher patenting rates and greater commercialisation success (Baldini et al., 2006; Siegel et al., 2007). In many African institutions, however, limited IP capacity and infrastructural gaps remain significant barriers to harnessing this potential (Olanrewaju et al., 2020; Adeyeye et al., 2022). Awareness transforms IP from an abstract legal concept into a practical strategic tool, enabling innovators to effectively protect, manage, and commercialise their creations, thereby strengthening the entire innovation ecosystem.

## Theoretical Framework

This study is grounded in innovation systems theory and knowledge management theory. Innovation systems theory posits that innovation is not a linear process but a systemic outcome emerging from complex interactions within a network of actors, institutions, and policies. Key components relevant to IP include actors and networks such as universities, research institutes, and intermediaries; institutions including formal IP laws and informal norms; knowledge infrastructure comprising the education system and research base; and demand and markets that pull innovation. From this perspective, IP awareness is a critical system function that lubricates the system, reducing transaction costs in collaboration and strengthening the appropriability regime that allows innovators to capture benefits from their innovations.

Knowledge management theory focuses on the creation, protection, and utilisation of knowledge assets. The combined lens of these theories positions IP awareness as systemic, strategic, and mediating. It is systemic as a factor that reduces friction and enhances connectivity in the innovation ecosystem. It is strategic as a core organisational competency that transforms knowledge into appropriate assets. It is mediating as a critical variable that explains how the institutional environment influences internal firm processes to ultimately drive innovation performance.

Grounded in these theories and informed by prior empirical literature, this study advances four hypotheses. H1 proposes that Intellectual Property awareness has a positive and statistically significant effect on innovation performance within higher learning institutions. H2 suggests that higher levels of IP awareness are positively associated with increased engagement in specific innovation activities, including patenting, research commercialisation, industry collaboration, and entrepreneurial initiatives. H3 posits that institutional support structures, including availability of IP funding, presence of research coordination mechanisms, and access to IP management services, positively moderate the relationship between IP awareness and innovation performance. H4 proposes that IP awareness levels differ significantly across institutional actor groups, specifically academic staff, researchers, postgraduate students, and administrators.

## METHODOLOGY

A mixed-methods explanatory sequential design was adopted to enhance the validity, depth, and contextual richness of the findings. This design aligns with the study's theoretical framework, where Innovation Systems Theory demands understanding of broad systemic patterns and interactions, and Knowledge Management Theory requires nuanced exploration of internal organizational processes and cognitive factors like awareness.

The study targeted key stakeholders within the academic innovation ecosystem of Mulungushi University, comprising five distinct strata: academic staff as primary generators of research; researcher-focused staff including principal investigators; postgraduate students as critical actors in knowledge creation; university administrators including heads of departments and directors; and innovation-related personnel from technology transfer and commercialisation functions. A sample size of two hundred respondents was selected from the defined population using proportionate stratified random sampling to ensure balanced and representative cross-section of the university's innovation system.

Data were collected using two primary instruments. A self-administered, structured questionnaire was delivered electronically via Google Forms, containing sections on demographic profile, IP awareness assessment using a multi-dimensional scale, knowledge management practices, innovation performance metrics, and perceptions of the university innovation system. The questionnaire was piloted with a diverse group to ensure clarity, relevance, and internal consistency using Cronbach's Alpha test, with refinements made based on feedback. Following survey data analysis, semi-structured, in-depth interviews were conducted with a purposively selected subset of participants, exploring narrative experiences, survey themes, perceptions of barriers and enablers, and suggestions for system improvement.

To examine the effect of IP awareness on innovation performance, multiple linear regression analysis was employed with the model specification: Innovation Performance equals beta zero plus beta one multiplied by IP Awareness plus beta two multiplied by Institutional Support plus beta three multiplied by Control Variables plus error term. Innovation Performance represents a composite index derived from indicators of patenting activity, commercialisation engagement, industry collaboration, and startup formation. IP Awareness is a standardized composite score measuring knowledge of IP types, institutional procedures, and strategic value. Institutional Support captures perceived access to IP funding, policy clarity, and administrative assistance. Control Variables include academic rank, years of research experience, faculty affiliation, and prior industry engagement. The Innovation Performance composite index was calculated as the mean score of four standardised indicators, each measured on a five-point Likert scale, and demonstrated good internal consistency with a Cronbach's Alpha of 0.84.

## RESULTS

The regression analysis revealed statistically significant relationships. IP Awareness yielded a coefficient of 0.41 with p value less than 0.001, indicating that a one-unit increase in IP awareness is associated with a 0.41-unit increase in innovation performance. Institutional Support yielded a coefficient of 0.29 with p value less than 0.01, demonstrating significant positive effect on innovation outcomes. The interaction term between IP Awareness and Institutional Support was positive and statistically significant with p value less than 0.05, confirming that institutional infrastructure strengthens the effect of awareness on innovation outcomes. The R-squared value of 0.46 indicates that approximately forty-six percent of variance in innovation performance is explained by the model, with an adjusted R-squared of 0.43 and Cohen's f-squared of 0.85 indicating a large effect size.

Standard regression diagnostics confirmed model validity. Variance Inflation Factors ranged between 1.3 and 2.1, well below the threshold of concern. Visual inspection of residual plots and Shapiro-Wilk tests indicated approximate normality of residuals. Breusch-Pagan tests did not indicate significant heteroscedasticity, and the Durbin-Watson statistic of approximately 2.0 suggested no autocorrelation.

Analysis of variance revealed statistically significant differences in IP awareness across respondent groups, with an F-statistic of 6.82 and p value less than 0.01. Postgraduate students exhibited significantly lower mean awareness scores than academic staff and administrators, supporting H4 and highlighting a structural gap in innovation capacity development.

The integrated qualitative and quantitative findings revealed that IP awareness serves as the essential operating system for innovation, but its full catalytic potential depends on supportive institutional structures which are currently underdeveloped. Identified institutional enablers included emerging IP management practices, where centralised invention disclosure processes formalised the first step from idea to asset, and research coordination structures, where organised research groups functioned as IP awareness incubators. Respondents affiliated with such centres had twenty-five percent higher mean IP awareness scores.

Persistent systemic constraints were also identified. The funding chasm emerged as the most severe constraint, with qualitative data revealing that invention disclosures stall due to zero budget for patent searches, drafting, or filing fees. Regression analysis confirmed that access to IP-specific funding was a stronger moderator of innovation output than general research funding. Weak enforcement and low perceived value constituted another significant constraint, with pervasive perception of paper protection diminishing motivation to pursue formal IP protection. The student awareness gap revealed that postgraduate students had the lowest IP awareness scores across all strata, linked thematically to absence of formal, credit-bearing IP modules in postgraduate curricula.

The findings collectively depict Mulungushi University's innovation system at a tipping point. The data suggest a potential virtuous cycle where institutional structures boost individual awareness, leading to more disclosure and collaboration, thereby strengthening institutional structures further. However, constraints act as systemic circuit breakers, preventing completion of the knowledge management cycle from creation to exploitation.

## Discussion

The findings demonstrate that IP awareness plays a critical catalytic role in shaping innovation-related behaviour within the university context. Respondents with higher levels of IP knowledge exhibited significantly greater engagement in invention disclosure, collaboration with industry, commercialisation efforts, and entrepreneurial initiatives. This supports existing empirical literature and confirms H1 and H2. Importantly, the results suggest that IP awareness influences not only procedural behaviour but also cognitive orientation. Researchers with greater IP understanding tend to reconceptualise research outputs as strategic assets rather than as endpoints culminating solely in academic publication, aligning with Knowledge Management Theory.

While IP awareness emerged as a strong predictor of innovation activity, the findings reveal that its impact is substantially moderated by institutional capacity, confirming H3. Despite increased awareness among certain categories of staff, the absence of adequate financial, legal, and administrative support structures significantly limits progression from invention disclosure to protection and commercialisation. The funding gap interrupts the innovation pipeline at a critical stage, representing from an Innovation Systems Theory perspective a systemic



failure within the institutional appropriability regime. Perceptions of weak enforcement capacity further undermine confidence in the value of formal IP protection, consistent with prior studies emphasising credible enforcement and institutional trust in sustaining innovation ecosystems.

A particularly significant finding is the comparatively low level of IP awareness among postgraduate students, confirming H4. Given that postgraduate students constitute a substantial portion of the research workforce, this gap represents a structural weakness in long-term innovation capacity. The absence of formal, credit-bearing IP education within postgraduate curricula limits early exposure to innovation management principles and reduces preparedness for commercialisation engagement. This finding reinforces calls for integration of IP education into research training programs, particularly in developing economies where institutional innovation cultures are still emerging.

Despite identified constraints, the study also reveals localised areas of institutional effectiveness within organised research centres and groups. These units function as micro-innovation systems where IP awareness is socially transmitted through mentorship and peer interaction. Affiliation with such centres was associated with higher average IP awareness scores and greater innovation engagement, illustrating the importance of meso-level institutional structures in mediating the relationship between individual awareness and system-wide performance.

Taken together, the findings indicate that IP awareness is a necessary but insufficient condition for sustained innovation performance. While awareness empowers individual actors and enhances innovation intent, its effectiveness depends on complementary institutional infrastructure including funding mechanisms, enforcement credibility, and streamlined administrative processes. This nuanced conclusion advances the literature by moving beyond a linear understanding of awareness-to-innovation relationships and highlighting the interaction between individual capability and institutional capacity.

## CONCLUSION

This study set out to investigate the effects of intellectual property awareness on innovation levels within a Zambian higher learning institution, employing a mixed-methods approach grounded in Innovation Systems and Knowledge Management theories. The research provides compelling empirical evidence that IP awareness is a statistically significant and positive predictor of key innovation outcomes at Mulungushi University, including patenting activity, industry collaboration, and entrepreneurial initiative. This core finding confirms the hypothesis and aligns with global literature, positioning IP awareness as a fundamental competency within the academic innovation process.

However, the study's greater contribution lies in its contextual excavation of the mechanisms and contingencies that define this relationship. While awareness is a necessary catalyst, it is not a sufficient one. The innovation performance of the university is not determined by the aggregate IP knowledge of its individuals alone, but by the capacity of its institutional system to convert that awareness into action. The identified constraints, primarily the critical lack of funding for IP prosecution and a perceived weakness in enforcement, act as systemic filters, blocking the pathway from disclosure to impact.

Therefore, the ultimate conclusion is two-fold. For researchers and individuals, enhanced IP awareness empowers strategic research design, facilitates collaborative partnerships, and unlocks the potential for socio-economic impact. For the institution and policymakers, investing in the soft infrastructure of awareness must be matched by parallel investments in the hard infrastructure of financial support, legal assurance, and streamlined processes. By delineating this interplay between agency and structure, this study offers a refined framework for understanding university innovation in developing economies, moving the conversation from advocating for awareness in the abstract to providing a blueprint for building the awareness-infrastructure nexus.

## RECOMMENDATIONS

Based on the empirical findings, several actionable recommendations are proposed for higher learning institutions. Institutions should develop and mandate a credit-bearing foundational module on IP and Innovation

Management for all postgraduate students, embedded within research methodology programs, and incorporate IP concepts into undergraduate final-year project guides and entrepreneurship courses. A continuous professional development program for academic and research staff should be implemented with basic and advanced tracks, with completion of basic IP training as prerequisite for leading externally funded research projects. A persistent, multimedia awareness campaign should be launched to demystify IP and celebrate successful innovations.

The existing research directorate's IP function should be transformed into a visible, resourced, and proactive IP Management Office staffed with legal, business, and technology transfer expertise. A visual IP Journey Map should be developed and disseminated, outlining every step from invention disclosure to commercialisation. A University Innovation Fund should be created specifically earmarked for initial IP actions including prior-art searches, provisional patent filings, and prototype development. A cross-functional Innovation Governance Committee should be established to oversee policy implementation and streamline decision-making. Reward systems should explicitly include IP generation and knowledge transfer outcomes in criteria for academic promotion and performance appraisal. A digital invention disclosure system should be implemented with regular innovation mining exercises within research centres.

For national policymakers and government agencies, Zambia's National IP Policy, Science Technology and Innovation Policy, and Higher Education Policy should be explicitly interlinked with shared objectives and metrics. Tax credits or deductions should be introduced for private sector entities licensing IP from Zambian universities or co-funding patent applications. The capacity of the Patents and Companies Registration Agency and the judiciary should be strengthened to handle IP disputes efficiently, with successful enforcement cases publicised to build confidence. Sector-specific innovation platforms should be funded and promoted around national priority areas. A National Pre-Commercialisation Fund should be created to provide grants for later-stage development of university technologies at Technology Readiness Levels four through seven.

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